

Nota. *This kind of Concaves, burning most forcibly of any fire we know of, even beyond that of a Wind-furnace, would be of great use, if they could be so contrived as to have a focus of any considerable largeness, to take in a good quantity of combustible matter at once.*

An Account of some Books.

- I. *MARC. MALPIGII, Phil. & Med. Bononiensis DISSERTATIO EPISTOLICA De BOMBYCE, Regiæ Societati dicata. Printed at London for John Martin and James Allestry Printers to the R. Society, in 4°.*

THE Occasion of this Curious and Laborious Discourse will appeare from the Preface to it. The Book it self gives an Account of the Production, Structure, Food, Growth, Sicknesses, Workmanship, Changes, Generation, and Death of the *silk-worm*; together with an accurate Anatomical Description of all, even the minuter parts of that Insect, and the varieties of them in the severall Changes, it undergoes; where yet the Author in such particulars, which he finds himself short off, or not well satisfied in, with great modesty refers himself to the Assistance and farther consideration of that *Society*, to whom he dedicateth this Epistle.

He begins with the Eggs and hatching of the Silk-worms, observes the Changes of their Colour: then proceeds to the growth of the Young worm; the various tryals in feeding it with divers other leaves but those of Mulberry's; their sicknesses and the prognosticks of them; the casting of their skins, together with all the steps and the whole manner of the same.

In the Anatomical Observations of the structure of this Insect, he takes notice, among many other things, of its *eleven* Rings or Incisures, and of how many small ones each of them is made up; giving their shape, different size, nature and composition. Then goes on to the Wrinkles of the Body, the Head, the Cranium, the Lip, Chin, Eyes, Teeth (cutting not by an up and down motion, but a laterall one) Hair, Leggs with their different shapes, articulations, claws, together with their posture and motion for Spinning.

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Of their *Internal* parts, he observes the quality of the humor, found in them, *viz.* concreting by the warmth of on's hand, and leaving a crust: next, the mucous and rosy-color'd skin, suppos'd to be the new skin, found under the exterior. Then he describes the various Muscles, and Fibres, both parallel, and oblique, more or less, together with the insertion of the Fibres in every Ring, and of every Ring in the Cavity of its neighbouring Ring, for producing the Progressive Motion of the Animal, the manner of which is described very particularly.

He passes on to the Vessels moistening all the parts, observing their branches and *anastomoses*; their termination in one common trunk, and the curious net-work they make. These vessels prolonged, he makes to be the *Lungs*, whose structure for Respiration he diligently describes, illustrating the same with Observations made of other Insects, and with some Trials shewing, both that Air issues out of their body, and that Oily liquors will suffocate them, upon the Account only of stopping the orifice of their Wind-pipe. He inquires also, Whether the *Motion* of the *Abdomen* be necessary in these Insects for Respiration, and seems to incline to the *Affirmative*.

From the *Lungs* he goes on to the *Heart*, which he saith reaches from the head to the tail, being of a strange figure, and rather *many* hearts, than one; whose motion of *Systole* and *Diastole* he describes, taking also notice, how the Vitall humor passes from one little heart to another.

The *Ventricle* he observes to reach also from one extreame of the Worm to the other; describing its substance, shape, fibres, and vessels bedewing it, together with its resemblance to the Ventricle of other Insects: where he particularly notes the great voracity of the Silk-worm, affirming, that it will eat as much in one day, as its whole empty body weighs.

In the sides of the Belly about the Ventricle he finds a *Woof of Vessels*, containing the *Silky Juices*; describing their progress from the mouth downward into the belly, and their strange flexures and meanders; whose *end* he affirms to have at length, after a long and patient search, found out. Of these Vessels he makes a large and curious description, as also of their different Juices, as the cause of the different sorts of Webbs and Baggs.

Neither

Neither is he wanting in giving an accurate account of the fine texture of the *Spinall Marrow*, and the *Cranium*.

But from the Anatomy of the parts he proceeds to their *Feeding*, and observes the various space of time for it.

He takes further notice, that though *stench* be no prejudice to them, yet a *Southern Wind* and an extreme *Hot Air* make them sick. He informes us also, how they are ordered after they have fed enough, and are ready to spin; as also, *how* they spin, what motions and postures they use in that work; how they apply their feet and claws; how they hold their head and other parts of the body; of what figure their Webbs; in what time the Bagg is finisht, together with the difference of the Silk on one and the same bagg, and the conjunction sometimes made by *two* worms in spinning *one* bagg, which he saith causeth such an intanglement that the Silk cannot be wound off.

He forgets not to set down the *gradual Change* of the Silkworm, after 'tis exhausted by spinning; how all the parts are altered, the testicles enlarged, and the whole disposed to assume the form of the *Aurelia* or *Chrysalis*, divesting it self of its coat in the space of 1. min. 10. sec; the manner of which he very curiously describes, having attentively beheld it himself. He adds, how the Wings and other parts are form'd for the *Papilio* or *Butterfly*, and how indeed the Wings are latent under the second and third Ring of the Worm, before it works the bagg.

Of the *Aurelia* he describes its shape and all the parts, and particularly the remaining *Vestigia* of the silky Intestins, the Ventricle, and the concrete melleous Juyce therein, together with some though rare and scarce perceptible motion of the Heart. Then, how the *Aurelia* changes into a *Butterfly*, and in what time, *viz.* in the space of 10. days in Summer, and in a Months time in Autumne and Winter. Where he adds, how the *Eggs* begin in the Femals upon their change into *Aurelia's*, and how at last the *Butterfly* breaks out by the meanes of its Claws and a sharp liquor.

To this he subjoyns a particular description of the form of the *Butterfly*, and all its parts; of the Motion of its Heart, of the differencing marks of the Male from the Female; of the curious
structure

structure of the *Ovarium*; the parts of generation; the coit, and the strange length of the time of it. the Male beating his wings about 130. times in one copulation; the multitude of Eggs amounting to 300. 400. sometimes 500; and the death of the poor Fly, following 5. days after the coit in Summer, but not before the 12th day in August.

He omits not to instruct the reader of the ways of *keeping* the Eggs, and the manner of ordering them for Hatching: where he takes notice of one kind of Butterfly in *Sicily*, which is made *twice* fecund in *one* year, *viz.* in the end of Aprill, and the end of August.

He concludes with the way of *Winding off* the Baggs, and informes us, how many threds together will make good substantiall silk; where he affirmeth, that sometimes he hath reckon'd 930. *Bononian* feet of silk, wound off from one bagg, without the exteriour *lanugo*, and the inmost last part, which both together might make a fourth part of that length more.

II. DESCRIPTION

II. DESCRIPTION ANATOMIQUE d'un
 CAMELEON, d'un CASTOR, d'un DROME-
 DAIRE, d'un OURS, et d'une GAZELLE. A
 Paris 1669. in 4°.

THE Observations of these Animals dissected were made in the Royall Library at *Paris* by some of the Ingenious Philosophers there.

Of the *Cameleon* (which they say was an *Egyptian* one; they alledging, that there are two other sorts, one of *Arabia*, and another of *Mexico*) they chiefly observe: *First* that its contrary motions of Swelling and Un-swelling are not made as in other animals, dilating and presently after contracting their breast for Respiration, in a constant and regular order; since they have seen it swell for the space of above two hours, during which time it would indeed un-swell a little, but almost indiscernibly, and also a little swell againe, but with that difference, that the dilatation was more suddain and more visible, and that by long and unequall intervals; they having also observed it to subside for a long time, and much longer than swell'd.

Secondly, that the grains in the *Cameleons*-Skin were diversly posited, and of a blewish-gray, when the animall was in the shade moveless, and had not been toucht a long while; but that the pawes underneath were white-yellowish, and the space between the graines, of a pale and yellowish red: and that the said gray, colouring him all over when at rest, and remaining on the inside of the skin, when flead, (which seem'd to argue, it was the naturall colour) did, when expos'd to the day-light, change in the Sun, so that all the places of its body, struck by that light, took, instead of their blewish gray, a browner gray, approaching to a minim; but the rest of the skin, not shone upon by the Sun, changed its gray into divers brighter colours, which formed Spots half an inch big, of an *Isabella*-colour, by the mixture of the yellow-pale in the graines, and the light brown in the ground of the skin: the other skin, not shone on by the Sun, and remaining of a gray paler then ordinary, being like cloath mixt of wool of divers colours, the ground continuing

as before. The Sun ceasing to shine, the first gray return'd by little and little, and being then toucht by one of the company, there appear'd presently many very black spots on his shouldiers and fore-feet, which hapn'd not, when he was handled by those that took care of him. Being wrapp'd in white linnen for 2. or 3. minutes, he was taken out whitish, and having kept this colour a while, it vanisht insensibly: which Experience refutes those, who give out, that the Cameleon takes all colors but white. Having put him on divers things of several colours, and wrapt him up in them, he assumed none of their colors, but the white, neither took he this, but the first time of the trials.

Thirdly, the structure and motion of his Eyes, turning two different ways at one and the same time, which yet is not true of the Cameleons of *Mexico*. Where 'tis observ'd, that the necessity, impos'd by nature on all other animals to move both their Eyes together the same way, is not caused by the conjunction of the Optick nerves, because that also is found in the Cameleon it self.

Fourthly, his way of taking hold of the small branches of Trees, like that of a *Parret*, who puts two of his claws before and two behind, whereas other Birds alwayes put three before, and one behind.

Fifthly, his having no Spleen; a very little Heart, and exceeding little Brain, in which appeared no mark at all of any sense for Hearing, this animall neither receiving nor giving any sound.

Sixthly, his Tongue being furnisht with and fastned to a long tromp, serving to lanch it out, for the taking of flies, on which he feeds, and not on Air alone; the Observers having found many flies in his stomach and Guts; and taken notice also, that this Cameleon, they discourse of, voided divers stones of the bigness of a pea, which he had not swallowed, but bred in his gutts, seeing one of them, being dissolved in distilled vinegar, inclos'd the head of a fly.

By which Observations it appears, that though *Orators* have lost those pretty subjects to exercise their Eloquence upon, concerning the Wonders of the food, and of the Change of Colours in Cameleons; yet *Philosophers* doe now meet with
new

new particulars, touching the motion of his Eyes and Tongue, and the manner of altering his Colour according to his passions, which are no less capable to employ their Wits; as is at large and learnedly deduced by the Authors of these Observations.

In the *Castor* they note;

First, his two sorts of *Hair*, one short, soft and fine, to defend him from cold; the other long and thick, to receive the mire, in which they often wallow, and to hinder it from getting to the skin.

Secondly, his Teeth, formed after a peculiar manner, exceeding fit to cut Trees, which they do to build themselves lodgings to breed their Young ones in; for which purpose Nature hath also furnished them with such fore-feet as exactly resemble the hands of a man; the hind-feet, proper for swimming, being formed like those of a Goose.

Thirdly, his Bladders containing the *Castoreum* (distinct from the Testicles) of which they found four great ones about the lower part of the *Os pubis*, of which two were above the other two, but closely joyn'd to one another, the two upper being likely to prepare that matter, and the two other, to bring it to the perfection of more consistence, and unctuousness, as also of a stronger sent and deeper yellow colour; for which purpose the two latter are of a glandular composition. But under this second sort of sacks they found yet another long one, full of liquor, more yellow and liquid, and more elaborate, then that in the former; of a different smell, and like to the yolk of an egg; of which they write from *Canada*, that *Castors* use it to make themselves an appetite, when they want it, and that they squeeze it out by pressing with their paws the bladder, which contains it; and that the Savages anoint with it the Gins they set for these animals, to draw them thither.

Fourthly, his Testicles not fastned to the Back-bone, as several Authors affirme, but on the sides of the *Os pubis* about the groyne, altogether hid, and not appearing at all, no more than the *penis*, before the skin was remov'd. The *Penis* contrary to that of a Dogg, which goes from the *Os pubis* to the Navil, descended here downward to the vent of the excrements, at which hole it did terminate.

Fifthly, the Heart had its left Auricle bigger than the right (which is also found in some other animals;) whereas in Man 'tis contrary. They found no *foramen Ovale*, which many Authors assure to be in all Amphibious Animals, and even in Men, that are *Divers*, and stay long under water. But it may be, that this *Castor* having been kept divers years from going into the water, that hole had been closed.

But we must proceed to the

Dromedary, wherein is chiefly noted; *that* it hath but two small hoofs on the end of his feet, the soles of them, flat and large, being very fleshy, and covered onely with a soft, thick and little callous skin, proper enough to march in the Sands of Asia and Africa; *that* the six *Callosities* of his Leggs being open'd, their substance was found to be between flesh, grease and ligament, some having a collection of a thick purulent matter mixed; *that* that Callosity under the Breast, strongly fastned to the *Sternum*, was considerably bigg every way, and much suppurated; *that* his inward parts were like enough to those of an Horse; but that in his 2d Ventricle there were many square Openings, being the Entry of about 20. cavities, made like sacks, placed between the two membranes that compose the substance of the whole stomach, in which sacks, as in convenient receptacles, 'tis probable that Camels doe for a long while keep the water they drink in great quantity, when they meet with any, for a supply in dry and desert places; *that* the *Lungs* had but one lobe; *that* the Heart was extraordinary bigg, *viz.* 9. inches long and 7. large; *that*, contrary to other Tongues, which are every where rough from within outwards by store of small eminences tending from *without* inwards, a part of this Tongue had them from *within* outwards &c.

The *Bear* hath a very particular structure of his Leggs, and their substance, very good to eat, is a kind of thick fattish ligament, out of which may possibly issue that moisture, which Authors say is suckt by this Beast for its nourishment in winter. Its *Claws* differ from those of a Lyon; by being more equall and more compact. The *Teeth* differ from those of a Lyon in this only, that they are less. The *Thorax* consists of 14 Ribbs. There appeared no distinction in his *Gutts*, as in other animals; they

they were 40. foot long, whereas those of the *Lyon*, formerly dissected by the same Observers, had but 25. The *kidneys* had a very peculiar structure, viz. a membrane containing 56. small kidneys, actually separate from one another, each cover'd with its proper membrane; here and there connected by very fine fibres; every one having a large *base* outwards, and streightning it self inwards; that *base* being in some a Hexagon, in the most a Pentagon, and in others Square; and the whole representing as 'twere a ripe *Pine-apple*: therefore probably so bigg, and divided into so many smaller kidneys, that it might containe and evacuate the greater plenty of serosities, to be found in a Bear, because he hath but little of insensible transpiration, by reason of the thickness of the habit of his body, not favourable for it. The *Brains* they observ'd to be 4. times bigger, than that of the *Lyon* they open'd. The *Eyes* exceeding little, the *Chrystallin* very odly situated. and drawn on one side of the *Axis* of the Eye.

But that which is particularly taken notice of in the description of this Animall, is, 1. The strength of its Temper and constitution, by which it is able, though it have but a lirtle stomach, and streight gutts (among which there is no *Cacum*) to digest with ease all sorts of edibles, raw flesh, Fish, Lobsters, Insects, Herbs, Fruits, Hony; supplying by the force of his temper the defect of a commodious structure. 2. The small capacity of its *Liver* and *Spleen* to receive excrementitious matter; which argues, that the action of the naturall Heat is so well regulated, that 'tis not subject to defect or excess. 3. The singular faculty of encreasing to a great bulk, by which, though it be born exceeding small, it grows a very big animal, its natural moisture being so perfect, as to render the parts capable to extend themselves, and to increase their magnitude without lessening their strength.

The *Gazelle* or wild African Shee-goat (the same with the *Dorcas* or *Strepsiceros*) was of the bigness and shape of an Hind, its hair fallow, except that of the belly, which was white; its Eyes big and black; the Horns black also, streak't cross-ways, 15. inches long, very sharpe, pretty streight, but a little turned outwards about the middle; in part hollow, and by a

sharp bone fastn'd to the Head. Tooth-less in the upper Jaw, as being of the ruminating kind. Very cloven footed; and small-hoofed before, but thick-flesh't on the hinder parts of the legs, like a Camel.

As to the inward parts, it had a *Liver* shaped like that of a man, divided into two Lobes; and in the hollow part of the Liver there were two *Lymphatick* branches, which fastn'd the trunk of the *Vena porta* to the superiour Orifice of the Stomach. The substance of this Liver plainly appeared to them glandular, each grain of it being pierced, as they thought, in the middle, by reason of a little red cleft they had, whence issued blood, when pressed. And the cause, why these glandules seldome appeare vnsevered one from another, may be, that when the animal is in health they are spongy and fill'd out with blood, which they are not, when it is sick, or emaciated, &c.

III. *LABYRINTHUS ALGEBRÆ*, Auth. J O H
F A C. F E R G U S O N. Printed at the Hague in 4°. 1667.

WHat we mention'd in *Numb.* 46. p. 931. sect. 8. about new methods, pretended by some to be found out for giving the Roots of all Cubick and *Bi-quadratick Equations*, albeit those Roots are Fractions or Surds, Binomials or Residuals; We find since to be already accomplished by this Dutch Writer; upon the Cursory perusal of whose Book we take the first part of it to be, as follows.

1. He shows, how to extract the *Square* and *Cubick* Roots out of *Binomiall* and *Residual* Numbers, as a *medium*, which he afterwards hath occasion to use.

2. Then proceeds to give one general Rule for finding the Roots of all *Quadratick Equations*, and commends the worth of his method from the easiness, although you be incumbred with Fractions or great Numbers either in the Coefficients or Absolute.

3. He gives one General Rule (where others make more Cases of it) for finding the Roots of all *Cubick Equations*, in which the Second term or *Quadratick species* is wanting, and then shows, how all other *Cubick Equations*, wherein it is present, may

may be reduc'd thereunto, by taking it away. Moreover, when such *Æquations*, wherein you are incumbered with *Fractions* or *Surds*, either in the Coefficients or Roots, are propos'd, he goes on to find the Roots, sought in his own method, and when not explicable but by a *quàm proximè*, according to the general method of *Vieta*, in the use of which method, he, determining the number of Figures in the Root, takes away the trouble of all the sub-gradual Punctations.

4. When he comes to *Bi-quadratick Æquations*, he intimates, that all such *Æquations* may be reduced into two *Quadratick Æquations*, but not without the aid of a *Cubick Æquation*: And first, when the second Term or *Cubick Species* is not wanting, he shews how to find the said *Adjutant Cubick Æquation*, by placing the two highest Terms of the *Æquation* on one side, and the rest of the Terms on the other, and then finds such Quantities, which, added to either side, render the same capable of a square Root; and this preparation being made, he thereby obtains the *Cubick Æquation* and the Root thereof, which serves for the purpose premised; to wit, to divide the *Bi-quadratick Æquation* propos'd into two *Quadratick Æquations*, and so solved.

Further, in regard that all *Æquations* are more easily solv'd, when some of their Terms are wanting, than when all are present; he proceeds to shew, how to take away the *second Term*, and, supposing it gone, gives easier Rules for finding the aforesaid *Cubick-Æqua-*

Æquation; by aid whereof, the propos'd *Bi-quadratick* Æquation may be divided into two *Quadratick* ones, as before.

And then, in regard it often happens, that Æquations are not otherwise explicable than by a *quàm proximè*, he proceeds according to the General method of *Vieta*, as in *Cubicks* last above mention'd.

The whole Doctrine is illustrated with great variety of choice Examples, and the Author intending hereafter to treat more fully of *Algebra*, promiseth to extend his methods to Æquations of *higher* degrees, and to render the same more general. The remainder of the Book doth principally treat of *figurate* Arithmetick.

And here we think it fit to intimate, that divers good Treatises of *Algebra* have been lately publish't in *Low Dutch*. This Author cites Questions out of the 3d Century of *Questions* in the *Officina Algebrae* of *Marten Wilkins*, which we have not seen. *Gerhard Kinkhuysen* hath of late years publish'd several distinct *Quarto*-Books, viz. A *Traët of Analytical Conicks*: A *Collection of Geometrical Problems, Analytically solv'd*; as also such an acceptable *Introduction to Algebra*, that by the encouragement of some of the *R. Society* it hath been Translated into *Latine*, and fitted for the Press; to which will be annexed the *Methods and Examples of Ferguson* about the *Roots of Æquations*. And we have little reason to doubt, but that the just now mention'd *Introduction* will meet with such an acceptance, as shall quicken the Stationer

Stationer to proceed in the Translation and Printing of the rest of the Books above-mentioned, or others of the like kind.

Ferguson about the Matter mention'd is more full than either the *Algebra* of *Frans Van der Huys*, an *Octavo* Book in *Low Dutch*, 1654. or *Kinkhuysen*: neither do we find, that *Ferguson* ascribes the Invention of those Methods to himself.

IV. AN ANSWER to HYDROLOGIA CHYMICA, of WILLIAM SYMPSON, by ROBERT WITTIE, M. D. Printed for John Martyn at the Bell without Temple-Barr, in 8° 1669.

The Learned Author in this Answer undertakes to prove, that all the Mineral Ingredients, which he in his First Book on this Subject affirm'd to be in the *Scarborough-Spaw*, are really there, and that his Antagonist himself, unawares, acknowledges them to be there; so that the judicious Reader of both these Authors will find, that the difference between them, whether in the Matter, which concerns those Ingredients of the said waters, or in that which respects the two ways of practising Physick, the *Galenical* and *Chymical*, is indeed not so great, as the heat of Contention seems to make it.

And certainly, if the Professors of this Art would but lay aside Animosities, personal Reflexions, and private Considerations; and withall acknowledge, as they ought, that new and great discoveries may be made

made by careful Observations and Experiments, they would easily agree and joyn together, not only their Parts, Natural and acquired, but also the two so much celebrated methods of administering Physick, for curing both acute and chronical or contumacious Diseases; which is the true way to do service indeed to Mankind, and to entertain and raise the Credit of that Profession.

Nota. By the oversight of the Printer, some Lines were left out to the breach of the Sense, in the Authors Animadversions upon Mr. S. his Epistle, at the bottom of the 3d Page, which may be thus corrected; Like that of the Traveller that went from Jerusalem to Jericho, who fell among Thieves that stript and wounded him, 'tis no fault of mine; my work shall be like that of the Samaritane, &c.

ERRATA.

Numb. 48. p. 962. l. 7. l. *Genetivum*. In the present Numb. p. 981. l. 18. l. *scaled wings*. p. 983. l. 31. l. *occasion'd*. p. 987. l. 26. l. *besides those of*. p. 992. l. 3. l. *shoulders*.

L O N D O N,

Printed by T. N. for John Martyn Printer to the Royal Society, and are to be sold at the Bell a little without Temple-Bar, 1669.